Slavomír Hanzely

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Synopses

- **Researcher** tackling problems on the boundary of Mathematics and Computer Science. Enjoying testing my skills against new challenges
- Proven performance in working independently, collaborating with peers, and leading projects
- Efficiently communicates complex ideas to audiences of all levels and cultures
- Qualities: quick learner, persistent, well-organized, high attention to details

Expertise

Optimization, machine learning, federated learning, mathematics, algorithms, programming

Education

King Abdullah University of Science and Technology (link), Saudi Arabia
Ph.D., Applied Mathematics and Computational Sciences 2023 (expected)
MSc., Applied Mathematics and Computational Sciences 2020
Topic: Optimization for Machine Learning, group of prof. Peter Richtárik

Comenius University (link), Slovakia
BSc., Computer Science 2019
Thesis: Random sampling from uniform distribution on multidimensional polyhedra

Publications

- Sketch-and-project meets Newton method: global $\mathcal{O}(1/k^2)$ convergence with low-rank updates, Hanzely, FL workshop, ICML 2023, arxiv link
- Convergence of first-order algorithms for meta-learning, FL workshop, ICML 2023 (link)
  Mishchenko, Hanzely, Richtárik
- A damped Newton method achieves global $\mathcal{O}(1/k^2)$ convergence rate, NeurIPS 2022
  Hanzely, Kamzolov, Pasechnyuk, Gasnikov, Richtárik, Takáč
- Distributed Newton-type methods with communication compression, arxiv 2022
  Islamov, Qian, Hanzely, Safaryan, Richtárik
- ZeroSARAH: nonconvex optimization with zero gull gradient computation, arxiv 2021
  Li, Hanzely and Richtárik
- Lower bounds & optimal algorithms for personalized federated learning, NeurIPS 2020
  F. Hanzely, S. Hanzely, Horváth and Richtárik
- Adaptive learning of the otimal mini-batch size of SGD, OPT-ML, NeurIPS 2020
  Alfarra, Hanzely, Albasyoni, Ghanem and Richtárik

Presentations

Conferences: NeurIPS 22, ICCOPT 22, ICML 23, Rising Stars in AI, Mathematics in Armenia
Institutes: ISTA Austria, École Polytechnique, MBZUAI, KINIT, Flatiron, FLOW seminar

Awards

King Abdullah University of Science and Technology (link)

- Student research excellence awards (4 consecutive years: 2020, 2021, 2022, 2023)
  - an annual award to top KAUST student(s) in program Applied Mathematics
- Ph.D. scholarship of USD 75,000/year
- MSc. scholarship of USD 70,000/year

Vojtech Jarnik International Mathematical Competition (link)
2017: 8-10th place (39 universities participated)

Mathematical Olympiad (link)

2016: 3rd place, Slovak national round
International Mathematical Olympiad participation
2015: bronze medal, Middle European Mathematical Olympiad

Work Experience

Flatiron Institute, Simons Foundation (link) June 2022 – July 2022
Research associate, group of R. Gower
Investigatigated ML loss reformulations and designed fast variance-reduced algorithms

Mohamed bin Zayed University of AI (link) Feb 2022 – Apr 2022
Research assistant, group of M. Takáč
Developed second-order optimization methods that are fast, practical and provably convergent
• Resulting in a paper accepted at NeurIPS 2022 (link)

Wincent (link) (crypto trading company) Jun 2020 – Aug 2020
Research intern / software engineer
Analyzed, modeled, designed practical algorithms to optimize resource allocation of the company; and implemented the developed methods under various constraints

Mathematical Olympiad (link) 2017 – 2019
- Marked problems at the national round (3 times)
- Organized national selection camp for the International Mathematical Olympiad
  - restructured format of the camp and created all problem sets (team of 4 people)
  - created the problem sets for a day and marked the solutions (3 times)

Extracurricular Activities

Trojsten (link) (nonprofit organization) 2016 – 2019
Volunteer
- Prepared competitions and camps (in Math & CS) for talented high school students
  - co-organized 14 competitions (3 as a head organizer)
  - co-organized 20 camps (4 as a head organizer)
  - problem selection: 20 problem sets, ∼200 hours of work
  - marked solutions: ∼600 solutions, ∼150 hours of work
- Lectured: delivered 38 lectures (including a half-day lecture)

King Abdullah University of Science and Technology (link)
Teaching assistant for federated learning research
Assisting students with following aspects of research: project choice, literature review, algorithm development, experiment design, result presentation, write-up & submission

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Technical skills

Research
- Topics: federated learning, higher-order algorithms, stochastic optimization
- Reviewing: TLMR (journal, exceptional reviewer), NeurIPS (conference), ICML (conference)
- Qualities: patience, persistence, well-organized

Programming
- Python, PyTorch, C/C++, SQL, Bash, Julia
- Flexibility: experience with Matlab, R, Mathematica, Java, Javascript, Haskell
- Real-life time saving: automatization of recurring tasks (sending mails, filling forms, . . .)

Cross-cultural communication
- Co-organized a large ultimate frisbee tournament
  (largest tournament in MENA region & first mixed tournament in Saudi Arabia)
- Studying and working in various international communities
- Organizing a research group seminar
- Languages: English, Slovak, French (basics), Russian (passive), Spanish (passive)